Technology: Optoelectronics

Researchers at City University, Hong Kong have produced the smallest silicon wires to date. The wires, which can be used in nanoelectronics, are as small as 1.3 nanometers diameter. Tests show that the wires are stable and can be used in nanoscale computer chips, light emitting diodes and lasers. Key to wire stability is the presence of hydrogen rather than oxygen on the outside surfaces of the wires. Tests show that wires with diameters ranging from 7- 1.3 nm react to light differently, which could make it possible to use the wires as LEDs and lasers.

French market consultancy Yole Development, which specialises in the study of MEMS and Microsystems, has produced a report about MEMS manufacturers and applications. Entitled *'World MEMS Fab'* it covers Asia, North America and Europe includes profiles of more than 340 MEMS manufacturers. Price is €95000 (about $10,000) single area reports are cheaper.

SK Opto-Electronics will combine Korean expertise in automation, with low-cost Chinese production, US sales and marketing says CEO, Suk Youn Suh. Its aim "to take the low cost mainstream with a one-stop-shop." SKOE has six divisions. These are: active devices eg 2.5Gbit/s transmitter optical sub assemblies; precision optics eg various types of filters; polymer planar lightwave circuits eg variable optical attenuators and optical switches; silicon PLCs eg fiber arrays and erbium-doped waveguide arrays; MEMS eg various switches and VOAs and finally module packages and assembly eg transponders and an optical add/drop mux. SKO is part of the Korean industrial conglomerate, SK Group.

Package co-design proves elusive.

IC package design has become a huge bottleneck, but there are a few automated tools that can help, according to experts at the International Symposium on the Quality of Electronic Design. The urgent need for 'IC/package co-design' is driven by the emergence of flip-chip BGAs with over 2,000 pins and I/Os in the GHz range. C.Y. Ho, VP of engineering at Synopsys envisaged a $10 chip in a $50 package.

What is needed is an ability to co-design chips and packages, so packaging trade-offs can be evaluated early in the design. Using a common cost model, designers could determine how many layers go into the chip as opposed to the package. The reality is that packaging designers work alone, using little more than Excel spreadsheets.

While up to four layer BGA design is 'under control' a growing number of more than four layer packages have I/O speeds of over 2Gbps. Many more stacked packages are built, in which three or four die are stacked on each other.

Chip designers need to work in chip/package co-design, while package designers should provide a package library. There is a reported need for a concurrent die and package planning capability; comprehensive device verification; a vendor-neutral package database and unified die and package modelling and simulation. System-level partitioning with a trade-off analysis of packaging options is also needed.

Cadence fellow, Lou Scheffer noted when it comes to tasks such as signal propagation or IR drop analysis, there are separate tools for chips and packages, but they don't interact. Optimising pin assignments for both the chip and package is difficult because there are two different routers and cost models. Package interface formats are needed, but with a small market and a difficult problem, automated tool in this area are unlikely.

LED output up 70%

Toyoda Gosei is reported to be boosting its monthly production capacity of LEDs by about 70% during 2003 to 150m units. The company will spend ¥1.5bn (about $13m) to increase its plant capacity in Aichi Prefecture to 120m units by March, rising to 150m by September.

Toyoda Gosei, affiliated with Toyota Motor Corp, produces blue, green and white LEDs. Strongest demand comes from the mobile phone market, where LEDs are used as backlights for keypads and liquid crystal display (LCD) screens, but the automative sector is also holds potential.

Toyoda Gosei will also enhance its overseas sales operations and in China, will set up a sales firm jointly with Mitsui & Co. At present, the company sells LEDs through local subsidiaries and sales agents in China and other countries. Sales from LED operations are expected to rise 80% year-on-year to ¥25bn ($212m) to March 2003.

Automation for optoelectronics

LxSix Photonics started in November last year as an $8.4-million project, (funded by the Solidarity Fund QFL, Innovatech du Grand MontrÈal and Investissement Desjardins) to develop automation for the manufacturer of optical components.

LxSixPhotonics has developing a new commercially viable technology solution that uses UV light to create optical structures on any lightwave guiding medium. It offers Write-On, a highly automated manufacturing process for writing of Bragg Gratings onto optical devices enabling new writing techniques for direct Write-On fiber, Write-On wafer, and Write-On any guided optical medium (couplers, fiber arrays etc). Our "Write-On" technologies enable the development of high performance optical components. It is also offering a foundry service for OEM manufacturers.

"Our new automated production technology is currently the only one of its kind and enables us to produce value-added components that until now were very difficult to mass produce." said president Jacques Legaré,

The LxSix "Master Library of Processes" define everything from raw material, automated software control modules, equipment settings, I/O interfaces and statistical performance feedback loops enables a plug and play approach based on modular building blocks which can be used to deliver products to match a target specification at an optimised cost. Prospects are believed to include Bookham Technology, Lasertron, Furukawa Electric, JDS Uniphase and TriQuint Semiconductor according to VP of marketing Robert Caporuscio.